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LESSONS IN FIRE PREVENTION

FOR
USE IN THE PUBLIC
SCHOOLS

1914



ISSUED BY
J. A. CHURCHILL
SUPERINTENDENT
OF PUBLIC INSTRUCTION

DEPARTMENT OF EDUCATION

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To the School Teachers of Oregon.

Chapter 177, General Laws 1913, reads as follows:

(a) It shall be the duty of the principal or other person in charge of every public or private school or educational institution within the State, having an average daily attendance of 50 or more pupils, to instruct and train the pupils by means of drills, so that they may, in sudden emergency, be able to leave the school building in the shortest possible time and without confusion or panic. Such drills or rapid dismissals shall be held at least once for each month when said schools are in session and all doors of exits shall be kept unlocked during school hours.

(b) Every teacher or instructor in every public, private or parochial school shall devote not less than 30 minutes in each month during which the school is in session, to instruction of pupils between the ages of 6 and 14 years, in fire dangers [drills].

(c) For the purpose of such instruction it shall be the duty of the State Superintendent of Public Instruction to prepare a book conveniently arranged in chapters, or lessons, such chapters or lessons to be in number sufficient to provide a different chapter or lesson for each week of the maximum school year, one of such lessons to be read by the teachers in such schools each week. The book shall be published at the expense of the State under the direction of the State School Superintendent and shall be distributed in quantities sufficient to provide a copy for each teacher required by the provisions of this act to give the instruction herein provided for; the distribution to be made by the State School Superintendent.

Failure by any principal or other person in charge of any public or private school, or educational institution, to comply with the provisions of this act, shall be a misdemeanor, punishable, each offense, by fine of not more than \$20, nor less than \$5.00.

By the provision of this law all teachers of public and private schools are required: (1) to have at least one fire drill each month in schools having an average daily attendance of fifty or more pupils; (2) to instruct all pupils between the ages of six and fourteen years in the dangers of fire, and to devote not less than thirty minutes each month to such instruction; (3) failure to comply with these provisions is punishable by fine of from \$5.00 to \$20.00.

In compliance with Subdivision (c) of Section 1 of this act, I have prepared this Bulletin. For the use of those teachers who may wish some help in planning fire drills, I have included in this pamphlet some suggestions for which I am indebted to the State Fire Marshal of Iowa. For material used in this Bulletin, I wish also to acknowledge the following bulletins:

Dangers of Fire, by State Fire Marshal John W. Zuber of Ohio; Fire Prevention, by State Fire Marshal Harrison Parkman of Kansas; Fire Prevention, by C. A. Randle, Deputy Fire Commissioner of Nebraska; Lessons on Fire Prevention, Mamie Muldoon, Secretary Fire Commission, Nebraska.

You will notice that the law requires me to prepare a book giving a chapter for each week of the maximum school year, but that the requirement for the teachers is to devote not less than thirty minutes each month. In this pamphlet will be found eighteen lessons, but the manner of presentation and the time spent more than the minimum required will be left to the judgment of the teacher. I would suggest that in the primary grades great care be used in teaching this subject, so as not to frighten the child. Children from the ages of six to nine are very easily terrified by pictures or descriptions of fire, and irreparable harm may be done to the mind of an over-sensitive child. For the primary grades the subject should be treated in a matter-of-fact way, impressing upon their minds, of course, the necessity of care at all times in the matter of fires.

Below you will find also a copy of the law requiring the doors of all school buildings to open outward. If the door of your school building does not open outward, even though it is a one-room building, you should call the attention of the directors to this matter at once. You will notice that the person having control of any such building who fails to provide such doors is punishable by a fine of from \$10.00 to \$100.00, or by imprisonment in the county jail.

Doors of School Buildings Must Open Outward.

The outside doors, and other exits leading thereto, in every theater, church, school building, public hall, and every other building used for public purposes where people congregate, shall be so swung and hinged that they will open outward. [L. O. L. § 4987.]

Duty of Persons Having Control of Building—Penalty.

It shall be the duty of the owner, lessee, or tenant, or person having control of any of the buildings enumerated in the preceding section to provide outside doors, and other doors leading thereto in such building, opening outward, within six months after the time this act takes effect; and any owner, lessee, tenant, or person having control of any such building who fails or refuses to so provide doors opening outward, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than \$10 nor more than \$100, or by imprisonment in the county jail not less than ten days nor more than

six months, or by both such fine and imprisonment, and each day which such offending person shall fail to comply with the provisions of this act shall be deemed a separate offense. [L. O. L. § 4988.]

Suggestions for Fire Drills in Schools.

Inasmuch as the various school buildings differ greatly in size, height, number of exits, width of stairways and number of rooms, it is impossible to give general directions which will be suitable to all these various conditions.

The following general rules will be found helpful:

1. Require the pupils at all times to pass into and out of the room in an orderly manner. It is assumed that this is insisted upon in all of our graded schools. If it is not, it should be.

2. Each teacher should first practice with her pupils to see how they could leave the room in an orderly manner by the nearest exit. They might march to music if there is an instrument in the room or in the hall, or keep step with the class bell. The main points are, first, order; next, rapidity.

3. After each teacher has found the most orderly and quickest way of passing out the pupils of her room, she should then be ready to act in harmony with the principal of the building and should follow his or her directions explicitly.

4. In the larger buildings, it is well to have a gong or a special bell in the hall, the sound of which will mean to every child that a fire drill is on.

5. At the sound of this gong every pupil in the building should stand, and at the signal from the teacher the marching should begin.

6. The teachers in charge of the rooms on the first floor should not lose a second after the general fire gong is sounded in giving a signal for marching out, and the children should be given directions to go to the nearest exit.

7. Those occupying rooms on the second floor should start within a few seconds after those on the first floor have started, and by the time they reach the last landing of the stairway to the first floor, the first floor should be clear. If the building is a three-story building, the same general directions should be observed in clearing the rooms of the third story.

8. Care should be exercised that there be no crowding and that only such a number be permitted to enter the stairway at one time as can easily pass down. If the stairway will accommodate not more than two or three pupils abreast, only that number should be allowed to march together; if wide enough for more, a larger number should be arranged for. In many smaller buildings, with few exits and narrow stairways, single files are preferable.

9. Provision should be made not only for clearing the building when all pupils are in the study rooms, but when they are scattered

throughout the building in smaller rooms for recitation. Be prepared for prompt, systematic action at any hour or minute of the day.

10. The entire matter involves careful planning and prompt and careful execution on the part of the principal and teacher.

CHAPTER I

FUN IN A FIRE DRILL

(Mrs. M. L. Fulkerson, Salem, Oregon)

The Eighth Street School accommodated but four and a half grades yet nearly four hundred children claimed it as their school home. In the morning, at intermissions, and at night it resembled a bee hive at swarming time. The teachers, grouped together one autumn morning exchanging experiences and greetings, noted the congested condition on the playground and watched the little scraps of humanity hurrying this way and that, often colliding one with another in their joyous, innocent play.

"Isn't there a mob of them, and all on one block?" said one.

"Yes, and it frightens me to think what might happen should a fire break out in this building," said another.

Then the bell rang and in a moment order came out of chaos, the children marched to their respective rooms and the regular routine work of school began for another day.

If body-shaking sobs and copious tears are a sign of a broken heart, then surely there was one vital organ shattered into a thousand pieces in Room Two. Teacher just could not stand weeping on the part of her pupils. She preferred laughter always, so right in the middle of the story she had chosen for the opening exercises, she stopped short, looked and listened. Yes; there was no dodging the truth, little Jennie Harris was enveloped in the deepest woe.

Teacher went down the aisle, knelt by the little girl, put her arms about her shaking form and whispered: "Tell me, Jennie, what is it?" Jennie lifted her head from the desk only to lay it on Teacher's shoulder, and sobbed out: "I'm f—fr—fraid the schoo—school house will b—b—burn up"

"Why, dear! What makes you think that?"

"I h—h—heard one of the tea—tea—teachers say she was sc—scared of it this m—mor—morning!" A fresh burst of tears poured over Jennie's cheeks and down on Teacher's frilly tie, while the children looked on in breathless amazement.

Teacher rose to her feet. She saw it all now. It was just another case of "little pitchers having big ears." By this time several other little faces were looking unusually serious, and not a few apron pockets were being searched for the handkerchiefs that would evidently be needed in a moment more if the storm did not blow over. Just then Norman Davis raised his hand, cleared his throat and said: "There was an orful fire back East somewhere in a school house, and the little children was all—"

"That will do, Norman," said Teacher, and Norman sat down wondering why he had not been allowed the usual freedom in telling his story.

"Now, children, you must not let yourselves think that something terrible is going to happen here, for we are just as safe as safe can be."

"But, Teacher, s'posin' a fire would come?" piped a little voice.

"If it did, we should get out, of course."

"But, s'posin', Teacher, it should come and burn all out in the hall and we couldn't get through the door, what then?"

Teacher laughed aloud and the children smiled sheepishly. "Why, bless your hearts, don't you know I wouldn't let you burn? Do you know what I'd do?"

Chorus of, "No, no; what, Teacher?"

"I'd just raise all these windows, and out you'd go."

"Wouldn't we get smashed to pieces before we hit the ground?" This from Jennie, who had been neglecting her crying during the last few moments.

"No, child. Come and see. It's only a little way. We are on the first floor, you know."

The windows were opened and there was a rush, a craning of necks and much tiptoeing in order that each and every child might see that it was not far to the ground.

"Now, if you children will come up the steps and slip through the hall as quiet as mice when you come back, so that no one in the other rooms will know about it, we'll play there is a fire and we can't get out by the door. Want to?"

"Yes, yes! Goody, goody! Oh, what fun! Me first, Teacher!" Carefully, amid much subdued laughter, forty-three children went through the windows backwards, hung for an instant to the ledge by their hands, and then dropped to the ground. If any old fogey who thought school was for the sole purpose of curbing the lively spirit of Young America, had happened around the north side of the Eighth Street building just at that particular time, he surely would have died of heart failure on beholding this rank breach of discipline on the part of Room Two.

With hands over mouths to check the glee that would bubble over, the little ones all came back declaring it the greatest fun in the world, and several wanted to try it again, but Teacher said: "No; not any more today; some other time we may play again, but now we must read."

During the lunch hour Teacher told her experience of the morning to her co-workers. Then followed a solemn conclave during which it was decided that fire drills must be established in the school at once. Accordingly plans were laid to that end. Each and every one agreed that the children were to be told all about it, and that the first drill should be given the next day at precisely ten o'clock. The pupils in each room were to be instructed as to their movements in this drill, and all drills after this first should be given without previous notice. Twelve of the largest boys in the building were organized into what was known as the Fire Brigade and given special instructions. Two boys were to take the emergency hose, which hitherto had reposed undisturbed on a large hook in the main hall, and attach it to the

faucet at the right of the stairway; two were to act as policemen on the midway landings to catch any child who chanced to stumble on the stairs; two were to rush to the outer doors and see that they swung free; the remaining six were to go through the vacated rooms to assist any crippled child and see that no one remained in the building.

The next morning Teacher told her pupils that they would play "fire" again at exactly ten o'clock. "This time," said she, "everybody in the building is going to play with us, and of course those upstairs are too high up to jump through the windows, so we will play that the fire is in the basement and we will go out through the door. I'm going to appoint John for our captain, and you must all follow him. When you hear the first bell, stand up at once and face the door. John will stand with his hand on the door, ready to open it, when the second bell rings. Then he will walk out and you must follow one right behind another so that there will be room on the steps for the other children who are going to play with us."

"Teacher, what about Jim?"

Now, Jim was a little cripple, who could not walk without crutches, so Teacher said: "Jim will stay here at the door and see that you do not crowd and break the line, then he can come out. He is going to play this game, too." Jim's face brightened at this, for too often he was left out of the games.

"After today," continued Teacher, "I'm not going to tell you when we are to have a fire drill, for that is the name of this game. I'm going to surprise you. Perhaps the janitor will try to play a joke on us sometime and fill the halls with smoke just to scare us, but we won't be afraid, will we?"

"No, no, no! He can't fool us! We'll show him we are not afraid! Tell him to bring on his old smoke!"

Similar conversations were carried on in the other rooms, and promptly at ten o'clock the alarm sounded. Down came the Fire Brigade, sliding on the banisters in imitation of the real firemen of the city. Every boy knew his station and lost no time in reaching it. The bell rang once more. Four doors flew open on the first floor. Four doors flew open on the upper floor. Eight columns of children started at one and the same time, by way of the nearest route, for the open air. Not a word was spoken above whispers. Everybody watched his steps. The four rooms on the lower floor were vacated by the time the four columns from above reached the lower hall. Little Jim laughed in high glee when two of the Brigade made a pack saddle of their hands and carried him out bodily.

In a trifle over three minutes from the sounding of the first alarm, every child was back in his seat, the emergency hose again reposed on its large hook and every member of the proud Fire Brigade felt that he had grown an inch a minute during the time.

"Lots of fun," was the verdict of all the children.

Occasionally thereafter alarms were sounded, surprising everybody, but no one became frightened or complained, for all considered it a diversion and great sport, especially when the janitor turned on the smoke.

One morning in December, when childish minds were full of Santa Claus, Christmas trees and burning candles, little Jesse King helped

on his imagination by means of block matches. He would break one off, light it and watch the flame until it died out. A dangerous proceeding for little boys, to be sure, but Jesse did not know it then.

When Teacher called the class for number work, the block of matches in Jesse's pocket struck against the back of the seat as he rose, and soon a thin column of smoke found its way out of that pocket and rose slowly in the air. Jesse looked mystified. Teacher looked curious. A spot on Jesse's thigh felt uncomfortably warm.

"Jesse, turn your pocket inside out," said Teacher.

He made the attempt, was partially successful and the burning block fell to the floor. He was so frightened that Teacher thought he was punished enough for carrying block matches about in his pocket. She was just resuming the class work when Jennie Harris raised her hand and with a half smothered laugh said: "That was a real sure 'nough fire, wasn't it? Hadn't we better have a fire drill?"

"The very thing," said Teacher, and she went out and sounded the alarm.

CHAPTER II

DANGER OF THE PARLOR MATCH

The parlor match lights too readily for public safety. Stepping on this match has been the cause of burning women to death, and often property is destroyed by a person stepping accidentally on a match. It is criminal negligence to leave matches lying carelessly around on tables, desks, in drawers and on the floor; they will blaze up if even some ordinary article is thrown upon or rubbed against them. A very destructive fire occurred recently by a match being caught in the drawer of a bureau; the drawer was closed quickly and the match ignited and had a good start before the fire was discovered.

Thousands of fires caused by "carelessness with matches" occur in the United States every year. If you see matches lying carelessly around on tables, chairs, desks, on the floor or on window-sills, pick them up and put them in their proper boxes. A few months ago a fine dwelling was burned by a window being shut down with some force on a parlor match, which was lying on the window-sill. The force of the window shutting down ignited the match, and as it was late at night the man who shut the window walked away and did not know anything about the burning match until his house was on fire and he smelled the smoke. Just think from what a trifling bit of negligence a great loss can occur! Sparks flying from matches after they are struck often set fire to curtains and clothes.

The "strike anywhere" parlor match is very dangerous in the hands of children. They have no trouble whatever in lighting it. Rats and mice can light them with their teeth.

CHAPTER III

THE SAFETY MATCH

The "safety" match can be lighted only on the box in which it is sold. It is the only match for sale which is safe to have in a house.

It is made of the same wood, and with the same machinery as the parlor match; but the mixture into which it is dipped, to make the head, has no phosphorus in it. The phosphorus is in the mixture which is spread upon the box.

When the "safety" match is rubbed upon the box, it lights; but it will not light unless it is rubbed over the phosphorus mixture on the box. When the mother rat takes these safety matches home for her babies to play with, or for the father rat to use in filing down his eye teeth, there is no danger of the house burning down.

The sticks of all safety matches are soaked in some fluid which prevents any red-hot coal being left after the match is lighted and used. All other matches leave a red-hot coal, which may set fire to anything upon which they are thrown.

Louisiana and Wisconsin have already passed laws prohibiting the use or sale of any but the safety match. Other States will and should follow this commendable example by passing such laws. These laws should insist that the sticks of safety matches be dipped in a solution that would prevent the stick from burning after the head of the match had burned away. These laws when enacted and enforced regarding the sale and use of the safety match, should and will reduce the annual fire loss many millions of dollars every year, and save thousands of lives. Matches are made by ingenious and automatic machinery, from the time the match is taken up by the machine in the form of a pine block until the matches are discharged on a rotating table, all made and finished as we see them ready for use. They are even packed nicely and evenly in their boxes by automatic machinery. A machine will turn out hundreds of matches in a minute. Think of the wonderful progress in the manufacture of matches since the year 1880! These safety matches cost very little more than the dangerous parlor matches, and good citizens should refuse to buy or use any other kind of a match. They are not as dangerous in the hands of children and can not cause so many fires by being thrown carelessly about.

CHAPTER IV

COTTON CLOTHING

The touch of a flame quickly sets fire to any kind of clothing made of cotton, such as muslin, calico and flannelette. These are the materials most used in the clothes of children and women.

To lessen the number of these painful accidents, each grate or fire-place should have in front of it a wire screen, such as is used in many homes to keep the baby from falling into the fire. Every fire makes an upward draft of air from the room. This draft will pull to the flame any light material which comes near. Most of the burns from the open fires come from the dresses or aprons of women or children being drawn into the flame.

Stoves when red hot may set fire to dresses and aprons which touch them. A stove properly fed will do its work without getting red hot.

The easy and sure way to stop the burning of children is for parents to refuse to buy any cotton goods which have not been made fireproof.

This would force those who weave cottons to make them so they will not blaze up the moment a flame touches them.

Thirty years ago the chemist in Bellevue Hospital Medical College lost his only boy from his dress taking fire from a grate. The professor, after working a long time, found that if cotton cloth, muslin, calico and the like, were soaked in water having phosphate of ammonia dissolved in it, they would not burn. They would only char where they were touched by a flame. He spent years in writing and in lecturing about it. If the mothers of Oregon would say that these cloths must be made fireproof, it would be done by those who weave the cloths.

A mother can make clothes safe against fire after they are ready to wear. The German method of fireproofing light clothes is to dip them in a mixture made of sulphate of ammonium eight parts by weight, carbonate of ammonium two and a half parts, borax two, boracic acid three, starch two and water 100 parts. This has been used in Germany for a long time.

CHAPTER V

BURNING CLOTHING

If your own clothing takes fire, do not start to run. Lie down and wrap yourself in a rug, blanket, or coat, or roll over and over to put out the flame. Do not stand up so that the flame will come up about your face, for the great danger comes from breathing in the flame. If another person's clothing takes fire, wrap a rug or blanket about him and throw him down. Protect your face as much as possible while doing this, and if you must pass through a burning building close to a flame, hold something before your face. Until a physician arrives, burns may be protected from the air with cloths spread with vaseline or dipped in water that contains baking soda.—Primer of Hygiene, By John W. Ritchie and Joseph S. Caldwell.

CHAPTER VI

KEROSENE

Kerosene, or coal oil, is the refined product of mineral oil which comes from petroleum. The oil is pumped from the ground through wells, and is usually found in coal-producing districts. The oil as it comes from the ground looks like tar or molasses. The raw product is put through a process of refining, and from it is obtained kerosene, gasolene and naphtha, and several other products which are lubricants and not inflammable oils.

Many children are badly burned by the blowing up and burning of coal-oil lamps. When the lamp explodes or is dropped or knocked over and broken, the burning oil is splashed about and the clothes of persons in reach of this liquid begin to burn. All sediment should be emptied out of the lamps frequently. The principal danger from kerosene oil is in permitting the oil to become old and stale in lamps, and to attain a large amount of impurities by reason of the lighter oil being taken up by the flame and leaving the heavier and more danger-

ous oil in the lamp. The burners should be thoroughly washed and cleaned in soapsuds. When two-thirds of the oil in the lamp is used it should be filled again. Once each week the oil left in the lamp should be turned back into the can through a piece of cloth and a funnel to filter it clean. This is to remove dirt which has settled in the bottom of the lamp.

A lamp turned down low should never be left burning. This is a common practice where people desire to have a small amount of light, and is very dangerous. It is liable to cause the lamp to explode by reason of the draft of the lamp not being sufficient to draw off the accumulating gases from the oil through the little tube that is open by the side of the wick.

Do not try to blow out the lamp while the flame is high, but turn the wick down until the blaze is one-half its usual size, and then blow over the chimney top.

A lamp should not be set in the sun or close to a fire, or hung to the ceiling over a table on which another lamp is lighted.

A lamp should never be filled when lighted, or by artificial light other than electricity. Filling a lamp without first putting it out is very dangerous, as the vapor in the bowl of the lamp may expand until it reaches the flame and explodes.

The kerosene-oil stove used for heating and cooking really is on the same principle as the lamp, and should be treated in the same manner as the lamp. The stove and lamp both use burners and wicks of the same construction; and as the volume of oil used in the stove is so much greater, the accumulation of heavy oil in the receptacle is also greater, and it should be changed more frequently, and wicks should never be allowed to accumulate soot.

It is a common practice to start fires by pouring kerosene oil on kindling and cobs after they are placed in the stove. Coal oil, or kerosene, is used to start a fire in a hurry, because it gives off six times as much heat as wood in burning, and can be lighted by a match; but it can not safely be used, even in a stove that is closed. The vapor forms a mixture with the air, and is a powerful explosive. There are thousands of dollars' worth of property destroyed and many lives lost each year by this practice of starting fires with kerosene. If you desire to use kerosene to start a fire, put the kindling, wood or cobs in a metal receptacle; then pour the kerosene on the kindling or cobs out of doors. Afterwards put the cobs into the stove with the coal or wood, and there will be no danger of an explosion from this source. Leave the kerosene can outside, at least fifteen feet away from the stove.

Do not throw water on flames which started from kerosene oil, as this tends to spread them. Smother the flames with a carpet, quilt or heavy clothing.

CHAPTER VII

GASOLENE FOR COOKING, LIGHTING, CLEANING, ETC.

A gasolene stove makes work easier in cooking, but it is dangerous unless every precaution is taken in the handling of the gasolene and the manegement of the stove.

The tank of every gasoline stove should be placed outside the walls of the kitchen, for if outside the heat from the stove can not explode it, and the vapor from a leak would be carried away. The vapor could not ignite from the burner while the tank was being filled. The stove should be fastened to the floor, so that it can not be moved against the wall, and the stove should not be set on a box, shelf or barrel head. Gasoline stoves should have a bottom and three sides of metal.

If the tank is inside the room, do not fill it while the stove is lighted. The vapor of gasoline is heavier than air, and will fall to the blaze.

Do not pour gasoline from one vessel to another in the room where there is a fire or a light. The vapor of gasoline, which can not be seen, will be drawn to any fire that is near.

Do not fail to watch for leaks in the tank or burner. When cooking by gasoline do not leave the kitchen for any length of time. Always keep the cork in the gasoline can.

The most dangerous way of lighting is by gasoline. There is no such thing as a safe gasoline lamp. Gasoline lamps should not be carried about. If a gasoline lamp catches fire it should be carried out of doors if possible, the person carrying it going backwards so that the flame will be drawn away from him. Many houses and stores are lighted by gasoline vapor made by machinery outside the house. For use out of doors a gasoline light is not as dangerous as one used indoors. The gasoline lamp looks like a covered skillet on the shank of a big fishhook, and is usually hung on posts or trees. Being out of doors, the vapor from the lamp is not so dangerous, as there is not enough to make all the air explosive.

Gasoline is frequently used for cleaning grease from clothing. A pan of it in a closed room will fill the entire room with the vapor, and the chances are that there will be an explosion if a match is struck. One who uses gasoline for anything in a room in which there is a candle or lamp is likely to be severely burned. A lighted cigar or pipe carried into a room in which gasoline is being used will explode the air in it. Gasoline should only be used for washing out of doors, and away from buildings and away from smokers. When the washing is done the gasoline should be thrown on loose ground which will drink it up.

Silk dresses, ribbons or gloves may, if rubbed together, make a spark which will fire gasoline. Silk as thin as that in gloves may do this.

Gasoline fires may be put out by smothering with wet rags, woolen cloths, sand, or ashes.

If the amount of fluid burning is small, flour will smother it out. If the amount of gasoline burning is larger, a deluge of water is needed to shut off the air, as a small amount of water only spreads the flame, for the gasoline floats on it.

CHAPTER VIII

GAS

When the smell of gas is noticed anywhere in the house, doors and windows should be opened and all gas keys closed. The leak

should never be hunted with a light, for when a flame touches a mass of gas it will cause an explosion. The gas usually comes from a leak hole with force enough to be felt by the hand. It is likely to be where two ends of pipe come together, at an opening in a seam in the pipe, or at a sand hole in the cast-iron elbow. With doors and windows opened, a small leak will do no harm if the gas reaches no flame.

Many accidents come from the keys and pipes near stoves being turned open. The worst danger in cellars is from gas which has leaked from the main pipes under the street. This gas can not come up under the pavement, but comes up in the cellars through the loose dirt which surrounds the house. It is more dangerous because it has no smell. The earth through which it passes has taken from it the oil which gives it the smell which warns one that it is there. Many houses are burned each year by gas jets which have a hinge in them so they can be moved from side to side. They are often turned accidentally.

When one gas jet is left open without being lit, the unburned gas fills the room. Never blow out the gas light.

Gas jets should not be too near the window or door. The wind might blow the flame out, and the gas would escape and choke the people sleeping in the room. Any gas jet that can be moved from side to side should have stops on each side to keep the blaze away from wood, or the blaze should be surrounded by a globe or wire head to keep it away from the wall or window curtain. No gas jet should be nearer the ceiling than two and one-half feet.

The use of the rubber tube to carry gas to the stove is a constant source of serious danger. One of these tubes may be knocked off by a kick and let the gas escape, to explode if brought in contact with any artificial light.

CHAPTER IX

ELECTRICITY

LIGHTING WITH INCANDESCENT LAMPS

Electricity is a cause of light, heat, motion and lightning. It is not a substance for it has no weight. We can make it and measure it with machines. Electricity is spoken of as a fluid only because it flows. The heat of sunshine stored in coal, thousands of years ago, is used to make steam to move an engine. The engine moves a coil of copper wire near a magnet. This makes the current called electricity flow in the wire. The machine which changes motion into electricity is a dynamo. A dynamo makes electricity and a motor uses it. A motor is a dynamo run backward. The moving of a machine makes electricity at one end of a wire, which runs a motor at the other end and the electricity is changed back to motion in the wheels of a street car, or of a factory.

Electricity flows through copper or steel very easily. It moves through the air with difficulty, but not through glass or porcelain. It is such hard work for it to go through air that it makes the air white-hot where it passes. It is the streak of hot air caused by a bolt of electricity moving through the air that we call lightning, and the noise it makes is the thunder.

Electricity coming from a cloud to the earth usually goes through a tree or a house for it is easier for it to travel through wood than through air. Still, we know it is hard for it to travel through wood, for the tree or house struck by lightning is always shattered more or less. If the house has a lightning rod of iron or copper on it, that gives the electricity an easy path and saves the house.

THE INCANDESCENT LAMP

Electricity for lighting a house is safer than gas, kerosene or candles, because no matches are needed and there is no blaze to set anything afire. But if the wires are put in badly they get red-hot and start wood to burning. The number of buildings burned by electric wires in the United States in a year is about 1,200, and the loss from them is near nine million dollars.

WHAT CAUSES THE LIGHT FROM AN ELECTRIC LAMP?

The end of a copper wire carrying a current of electricity is placed against the end of the fine black thread within the glass bulb. Another wire touches the other end of it, so the electricity must pass through the thread. This thread, or filament, is heated until it becomes charcoal. Electricity has to work harder to get through charcoal than through copper wire. So, the thread is made white-hot, causing light. In some new lamps the thread is made from one of the rare metals. The thread would be burned at once if there were air in the lamp. The air is all pumped out through a small tube at the lower end. When the air is all out this tube is melted off, leaving the little point which is on every globe.

Only one-twentieth of the electricity used by an incandescent electric lamp is changed into light. The rest is changed into heat. So the lamp may get hot enough to set fire to anything that is easy to burn. A candle, gas jet, or kerosene lamp gives off 100 times as much heat as it does light. The common electrical bulb makes as much light as 16 candles, the larger size as much as 32 candles.

One may easily learn that the common bulb placed against a pine board will char it in four hours, and that it will blister varnish on the table in three minutes. If two thicknesses of muslin or curtain stuff are wrapped around a lighted bulb the material will begin to smoke in three minutes, and if pulled off at the end of six minutes, it will burst into flame. Cotton against the bulb will char in ten minutes and then a slight draft of air will set it afire. Newspaper chars in three minutes and takes fire in 45 minutes.

THE HEAT OF THE LAMP

Celluloid combs, pins and ornaments soon burn explosively if put against an incandescent lamp.

A pint of water with a lighted lamp in it will boil in an hour. An Oregon printer dried his raincoat by wrapping it around an incandescent lamp. When he took it off, a piece the size of the lamp dropped out of its back.

There comes a time in the life of every incandescent lamp when it costs more to feed it than its work is worth. This is known as its "breaking point," for it is cheaper to break it, and put in a new one.

A lamp reaches the "breaking point" when used four months in winter or twice as long in summer, when the evenings are short. A bulb which looks brownish should be thrown away.

Electrical bulbs so placed that the light from them goes straight into one's eyes, must be frosted or eyes will be hurt. It takes half as many more frosted lamps to make a room as light as plain ones would.

SHORT CIRCUITS

The wire which carries electricity to a lamp and the wire which carries away the current that is used in making the light are usually close together. If the covering of the wires is worn off, or is wet where they are near each other, the current will go across between them instead of going around through the lamp to do its work. Where the electricity crosses, the wires become very hot, often so hot they melt and set fire to anything near that will burn. In this way many houses are destroyed. This is called a "short circuit."

Many buildings are set afire by short circuits in the long cords from which some lamps are hung. In them the wires are twisted, with only the insulation between them. Persons wet them or tie knots in them, hang them over nails or wooden corners, until the covering is worn through and a short circuit forms. A short circuit where one of these cords is hung over a nail will make the nail red-hot and fire the wood around it. Another reason why long cords should not be used is that they allow one to move the lamp against things likely to take fire from it.

CHAPTER X

SPONTANEOUS COMBUSTION

The *Americana* gives the following definition of combustion:

"In consequence of the combustion of the carbon and hydrogen in fuel with the oxygen of the air being the universal method of getting heat and light; and as, when the action takes place the fuel is said to burn or undergo combustion, the latter term has been extended to those cases in which other bodies than carbon—for example, phosphorus, sulphur, metals, etc.—burn in the air, or in other substances than air."

Of spontaneous combustion, it says:

"Spontaneous combustion is the ignition of bodies by the internal development of heat without the application of an external flame. It not infrequently takes place among heaps of rags, cotton, and other substances strongly lubricated with oil, when, if the oil is freshly made, it is very ready to combine with the oxygen of the atmosphere and give out carbon and hydrogen. The heat thus developed, diffusing itself through a mass of highly inflammable substances, will in certain circumstances, be sufficient to set them on fire."

As spontaneous combustion forms in oily rags, shavings covered with paint, in old rubbish heaps, in coal bins, in hay mounds, barn lofts where alfalfa, hay or grain have been stored when too green or damp, and generally in out-of-the-way places, as cellars and attics of homes, the store and waste rooms of mercantile houses and factories, the fire

is not detected until it has a good start, and consequently is hard to control. Many fires classified as "unknown" in barns have been caused by heated hay, alfalfa or grain.

A painter related an experience he had which almost cost him his life. He had been working on a building and had used old cotton rags to wipe off his hands occasionally. The rags became thick with paint and turpentine from frequent use and he pressed them together and put them in his hip pocket. He was high up on a ladder painting when his clothing took fire, spontaneous combustion forming in these rags. He had to jump down and call upon his fellow workmen to help him. They smothered out the blaze before he was seriously burned. We could cite many such instances.

Never allow old rubbish, waste papers, excelsior, paints, oils, greasy rags, etc., to accumulate in kitchens, attics, closets, cellars, barns, sheds, and alleyways. Old waste in these places has caused many fires. Heat from the hot rays of the sun, from a furnace, from a chimney or stove will cause it to burst into flames; if oily rags or rags saturated with paint are wrapped tightly together or piled up on each other, spontaneous combustion may form and cause them to take fire, even if there is no heat or fire around. This may happen in a damp cellar. As old rubbish, rags, and waste, if they are not taken outdoors, are thrown in an out-of-the-way place, such as an attic, cellar, or closet, so their unsightliness will not be observed by passersby, when they take fire the blaze is likely to have a good start before being detected.

Never allow old rubbish or oily rags to be thrown around the premises of your home. If they can not be burned or taken away at once, see that they are placed in a metal can, never in a wooden box or barrel. Metal cans for this purpose should be kept out of doors, if possible.

Do not permit greasy rags, paints, oils, gasoline or coal oil cans, or any combustible material, to remain in school or church basements or closets, or under the stairways. Many school and church fires are caused from old waste and rubbish and excelsior left lying around the premises. If you find a condition of this kind in your church or school, speak to your teacher or the clergyman in charge, or tell your parents to do so. A very disastrous fire occurred in one of our large churches recently by a careless janitor leaving oily rags and paint in the basement. Spontaneous combustion set them on fire and the church was completely destroyed.

Never make a bonfire or a fire to burn rubbish within twenty feet of any building or near a wooden fence or shed. Never make a fire to burn rubbish on a windy day. Great conflagrations have been caused by "sparks" from bonfires and from burning rubbish. Clean out the attics and cellars of your home at least every spring and fall. All attics should have windows so they can be ventilated.

Many compounds, as floor oils and dust preventives, contain material which will cause spontaneous combustion. A number of fires have been started by spontaneous combustion in rags used for applying these oils or varnishes to floors, woodwork, and furniture. When you are through using rags saturated in preparations of this kind, you should see that they are burned or kept in a fireproof metal receptacle.

Never throw oily rags in the rubbish pile; they are almost sure to cause a blaze. Never leave rags saturated with kerosene, gasolene or naphtha lying carelessly around. They are fire hazards. Every store and business building should have metal cans provided in which to throw this kind of waste, and so should every home. A good rule to make in every household is that all greasy or oily rags be burned immediately after one is through using them.

There are a great many kinds of "dustless dusters" for household, school, church, and office use upon the market today. These dusters are treated with some oily or greasy substance to prevent dust from rising. They are almost as commonly used in homes today as was the plain cloth duster some years ago. Many of these new "dustless dusters" contain highly combustible material. A beautiful home recently caught on fire from one of these dusters which ignited from the sun's hot rays shining upon it through a window. Experiments have proved that rags saturated with oil used in wiping up floors have burst into flames when there was no heat or fire around. If these rags and dusters are used in the home, school, church, or office they should be kept in metal receptacles that are ventilated.

Have the old dead leaves and rubbish around your house cleaned away and burned. Many fires have been caused by a careless man or boy throwing a lighted match or cigar or cigarette stub in a yard, or along a sidewalk where old leaves, grass, and rubbish had accumulated. It is best, where it is convenient, to have rubbish and waste hauled away from your premises and disposed of by some one who makes that his business, but if this can not be done, then burn it out away from buildings and see that no sparks fly or fall where they will start a fire.

CHAPTER XI

GASOLENE

Gasolene is derived from the refining of petroluem oil. It is used for heating, power, light, and cleaning.

Every year over three thousand homes are burned in the United States and three million dollars in property destroyed by gasolene fires. At least one thousand people lose their lives and several thousand others are injured from the careless handling and use of gasolene.

Gasolene in its liquid form is harmless, but the vapor given off, when mixed with air, forms an explosive more dangerous than gunpowder. Gasolene will give off 130 times its bulk in vapor, and this vapor will make twelve times as much air an explosive gas, which will ignite from a blaze or a spark. Five gallons of gasolene will generate 8,000 cubic feet of gas—enough to completely fill a room 20 by 20 feet, and 20 feet high. When ignited it immediately expands to 4,000 times that space, causing a destructive explosion.

Extreme care should be taken to store gasolene where there is no chance for any of the vapor to get away. The difficult thing about gasolene storage is to get it in some receptacle which will not let some of it escape. The vapor from gasolene will run out of the smallest crack or opening. If the top of a gasolene can is left off, the vapor is

constantly rising from the liquid inside. The newly evaporated gasolene fills the inside of the can, runs out the top and down the side of the can, and, being heavier than air, spreads over the floor, and, like water, this vapor will settle and remain in a depression on the floor or under the floor for days, and even weeks, unless disturbed by a circulation of air. A spark from the stove, match, or even from a nail in the shoe striking a nail in the floor, may ignite the vapor at any time.

When more than five gallons of gasolene is handled at a time it should be kept in a steel tank, buried at least three feet under ground. The tank should be fitted with a gasolene pump and vent pipe that extends at least eight feet in the air. The reason for the long vent pipe is that the gasolene vapor will be too heavy to extend to the top, but will stand in the pipe and rise and fall with the pressure in the tank. When small quantities of gasolene are handled, the can should be placed where there is no danger from anyone accidentally coming near with fire. The can should be placed on a low shelf of a well-ventilated outbuilding. No bonfire or trash fires should be allowed near the building or to windward of it on a windy day. Gasolene should always be kept in a can painted red, and the can when emptied never be used as a container for any other liquid.

CHAPTER XII

HEATING

If stoves are used for heating, the pipe should be securely put together and closely fitted into the chimney. If possible, it should not be allowed to pass through a wooden partition, and if it does, it should be protected. Under every heating or cooking stove there should be a piece of sheet iron or tin to protect the floor. In school houses where stoves are used, a piece of zinc, or brick laid in sand, should be put under the stove and should extend two feet beyond the stove on all sides. This is especially necessary where fires are kept over night. Hot coals dropping out on the wooden floor often cause fire.

The stove pipe should be thoroughly cleaned and inspected often, to free it from soot, and to make all joinings secure, as sparks may escape into the room through rust holes and open seams. An elbow in the stove pipe lessens the danger of fire by preventing burning particles of kindling or soot from being drawn out of the chimney to the roof.

HEATING BY FURNACE

If the building is heated by a furnace, care should be exercised in seeing that the furnace is not too close to the floor of the house, and both the floor and the furnace should be protected by non-inflammable substances.

ASHES

Ashes from the stove or furnace should not be thrown around promiscuously. In the house they should be deposited in iron receptacles, closely covered.

Do not allow an out-of-door ash pile to touch a wooden fence or side of a building. The greatest care should be taken of the ashes, as fires may occur from spontaneous combustion in ash piles long after hot ashes have been added to the pile.

THE COAL PILE

Place the coal pile as much as 20 feet from the furnace, and have an opening nearby for carrying off heat. Coal should be stored when dry and not put in wooden bins or near inflammable material of any kind. Many fires occur from spontaneous combustion in the coal pile, since coal will take fire if heated to 275 degrees, which is only a little hotter than boiling water.

CHAPTER XIII

SMOKING

Many thousand fires are caused yearly in the United States by the smokers of the country. These fires originate mostly in barns, alley ways, and rubbish piles in the crowded city districts, and in livery stables. They are caused in two ways—by the half burned match thrown away by the smoker, or by a lighted cigar or cigarette stub tossed carelessly into inflammable material. If the responsible individual who endangers lives and property by fire were severely punished by law in our country, as in European countries, the man who uses tobacco in a pipe, or in cigar or cigarette form, would be less careless.

And it is not always the smoker out of doors or in barns who is careless. The smokers in offices, convention halls, and even in the private home, often toss the glowing match, or unfinished cigar, into a waste basket or other receptacle of inflammable material.

More than half the ten thousand matches used in America every second are used by smokers. The large-headed match, made especially for out-of-door smokers, is more dangerous than the ordinary match, because it burns several seconds after being thrown away, unless used in the wind, when usually the entire head is consumed before the cigar or pipe is lighted. It is sometimes called the wind match, because made for especial use in a draught. These matches light with a loud, snapping noise because of the extra large head. The smoker does not enjoy the sputtering and sulphur fumes so near his eyes, and consequently hurls it away half burned as soon as possible. If it happens to drop in inflammable substances, whatever these may chance to be, a fire follows—small in the beginning, but, many times, spreading until there is great loss of property and life. The smokers of our country should constantly remember that they are responsible for a large proportion of the fires each year, and should endeavor, by personal effort, to bring about better results. Our great United States of America is a leader of the world in many respects in these days of rapid progress—commercially, industrially, and politically—but she is far in the background when it comes to fire prevention. There is too great a difference between the \$2.51 per capita loss of this country and the \$.19 per capita loss of Germany. Who is to blame? Is it the government or the individual, or both?

CHAPTER XIV

BONFIRES

The bonfire is another source of fire in our country. Bonfires are frequent in the spring of the year, when lawns are being raked and cleared, and house cleaning is in progress. Fire is the surest way of destroying worthless rubbish and is the means employed by the average family.

In the fall of the year, when leaves are being burned, both in the city and in the country, many buildings are destroyed and often lives lost. Children all like a bonfire, and are often allowed by careless parents to play with fire in this way. When dry leaves, rubbish or other useless matter are being destroyed, care should be taken that the fire is at a reasonably safe distance from any building, and it should always be in charge of a grown person who is careful.

A bonfire should never be left until every ember is put out. Often at nightfall a bonfire, which has burned low, and is apparently "dead," is abandoned. During the night, when all are asleep, a strong wind arises, fans the smoldering ashes and carries the glowing embers to some nearby building or inflammable substance. Many serious conflagrations have originated in this way.

Every one, old and young, be careful with the bonfire.

CHAPTER XV

FOURTH OF JULY DANGERS

Every year, on the anniversary of our independence as a nation, we read in the daily papers how many people have been made dependent for life by their mad methods of celebrating the Fourth of July. Dependent because they have lost their eyesight, their limbs, or suffered other permanent physical injuries, or because by their carelessness with fireworks they have destroyed their homes, their business houses, and lost their savings accumulated by years of toil. The firecracker, the skyrocket, the roman candle, the cannon, and other "destructive toys," yearly dole out their share of pain and misery. The little toy balloon sent up as an attraction for the eye at night has many times dropped upon the roofs of buildings, in yards on dry grass, on barns, hay stacks, and other places, where it has caused the destruction of property worth hundreds of thousands of dollars.

So productive of fires are these fireworks that many of the most progressive cities throughout the country have passed ordinances prohibiting the sale or use of any kind of fireworks or explosives on the Fourth of July.

Each year new kinds of fireworks are manufactured and there seems to be an increase in volume of fire and explosive effect. It seems that the larger and brighter the fire or the louder the noise the more attractive is the article. However, since many officials and citizens have interested themselves in the matter of celebrating the Fourth in a safe and sane way, the loss of life and property has materially decreased. This decrease in loss of life and property is indisputably

due to the agitation by fire marshals and city officials against the dangerous method of celebration heretofore practiced on Independence Day. The fact that school children are being taught the great danger of using fireworks, and that their assistance is asked and given in helping to abolish the old, dangerous way of observing the Fourth, has a great deal to do with decreasing the enormous loss on this fateful day.

"In the ten years, 1903-1912, inclusive, a total of 39,808 people—the equivalent of nearly forty regiments—were killed in the celebrations of the Fourth of July."

We trust that all children in this State will cheerfully and willingly help in this movement to abolish the sale of deadly explosives and fireworks. Refuse to buy the dangerous articles; tell your parents you do not want them. Ask them not to use fireworks, and do all you can to discourage their use by others.

Each of you can do a great deal of good for your city or town each Fourth of July if you will act as little "fire marshals" and try and see to it that none of your playmates use fireworks. You can also tell grown people how dangerous they are, and tell them they ought to help you abolish their use. They are a menace to the public welfare, and no one has a right to endanger his neighbor's life or property.

The fire departments of our cities and towns are so overtaxed by the numerous calls they have on the Fourth that it is often impossible to respond when help is asked by neighboring towns. The lives of brave firemen, always jeopardized in going to and in service at fires, are especially endangered on this day by explosives thrown along the streets as they pass, while the hard and frequent runs are a great injury to the faithful horses on hot days, and the wear and tear of the fire apparatus makes it altogether a most deplorable situation and adds to the burden of the taxpayer.

Let each one of you solemnly declare that you will not use fireworks on this coming Fourth; that you will discourage their use by others as much as it lies in your power, and that you will use every precaution to make this Fourth the safest and most sensible one that has ever been celebrated in your town.

Enjoy yourselves, have games and lunches at your homes or at some park; organize parades, play ball and other games; enjoy any music that may be within your hearing, and on the 5th of July you will behold no sorrowful scenes of blackened ruins due to the foolish practice of using fireworks on the Fourth.

If you should be around where fireworks are used, never pick up any kind of an explosive after it is once lighted, even if it does not go off, and even if apparently there is no light or fire in it. Often the fire is only smouldering, and many accidents happen by a sudden explosion or burst of fire from an explosive article that is supposedly "dead."

CHAPTER XVI

DANGERS FROM CHRISTMAS TREES

Many fires are caused by candles on Christmas trees. The tree should be fastened firmly, so that it can not be upset, and should not

be decorated with paper, cotton or other inflammable material. Cotton, which is used to represent frost or snow, catches fire very easily. The same effect can be secured by the use of asbestos or mineral wool, which is safe. The candles should be placed on the tree so they can not set fire to branches above them, and should not be lighted by children. Before the gifts are distributed the candles should be extinguished. Electricity is much safer than candles for lighting Christmas trees. Doors should remain closed while the candles are burning, because of the danger from drafts swaying the branches or blowing curtains against the tree. The floor under the tree should be protected by a piece of zinc or iron.

The following precautions are given by the National Fire Protection Association in its efforts to lessen the danger from Christmas fires:

Don't decorate Christmas trees with paper, cotton or other inflammable material.

Use only metallic, tinsel or other non-inflammable material, and set the tree securely so that children in reaching for things can not tip it over.

Do not use cotton to represent snow. If you must have snow, use asbestos fiber.

Do not permit children to light or relight candles when parents are not present; they frequently set fire to their clothing instead. The tree itself will burn when needles have become dry.

Keep matches out of reach of children at holiday time; they like to experiment with them.

The light inflammable decorations in stores, churches and bazaars make fires easy to start and easy to spread. A match, a gas flame, or any electrical defect, may do it.

Watch gas jets.

Watch smokers.

Do not make the slightest change in electric wiring without consulting the electrical inspector.

The house of merriment is better than a house of mourning.

CHAPTER XVII

FORESTS, AND PROTECTING THE FORESTS FROM FIRE

(By F. A. Elliott, State Forester)

The Oregon lumber industry now brings about \$25,000,000 a year into the State; as much as our apples, fish, wool and wheat together. Eighty per cent of this immense sum goes to pay for labor and supplies. The lumber industry consists largely of labor, and so supports every other industry of the community. The money brought into Oregon by lumbering is the greatest source of revenue to the laborer, farmer, merchant, and professional man.

The importance of the forest resources in connection with the industrial development of Oregon was recognized when early in 1911 the present forestry law was enacted. It provides for the appointment of a State Forester, and carries an annual appropriation of \$30,000

for the fire protection and investigative work along forestry lines. The results secured have been most gratifying. In 1910, timber to the value of about two and one-half million dollars was killed or destroyed by fire, while last year but \$80,000 worth of timber was destroyed. The season of 1911 was considered by many fully as hazardous as that of 1910, so the small loss last year must be attributed to greater precautions taken by those who built fires in the open, and to greatly increased efficiency of all the organizations engaged in fire patrol and fire patrol work. The timberland owner, the U. S. Forest Service and the State spent more than \$88,000 in hiring men to patrol the forests, and about \$114,000 in fighting forest fires. Fully 600 men paid by these agencies patrolled the timbered districts of the State during the dry season. They put out, or assisted in putting out, 842 forest fires. Four-fifths of the fires were discovered and put out soon after starting, and before they had a chance to spread and destroy standing timber.

During the spring of 1911 a fire was started in an old slashing near a sawmill. After burning slowly for several weeks, it apparently died out. About a month later, when slashing had become extremely dry, several fires which had smouldered in old logs scattered over the tract broke into a blaze, which, spreading with great rapidity, burned mill property to the value of \$30,000 in the course of a few hours.

The point to be emphasized in considering the forest fire question is that most of the fires are preventable. Of the 842 fires reported for the year 1911, only 229, or 27%, were caused unavoidably, the remainder resulting through carelessness of engineers, campers, loggers, hunters, and persons starting fires in slashings. Every thousand feet of timber burned means a loss to the owner of about \$2.00, but the State loses about \$8.00, the cost of the labor and supplies necessary to manufacture it. If it were not for the tax derived from the timber lands, many schools in the State would be seriously hampered in their work because of lack of funds. The school children can do more, perhaps, than any other class in enlisting aid to protect the forests. A close observance of the following simple rules when in timbered regions will prevent hundreds of fires:

Do not toss away burning matches or tobacco.

Do not build a camp fire in leaves, rotten wood, or against trees or moss, where it may spread or where you cannot be sure it is out.

Always scrape (toward the fire) a strip clear around your camp fire, digging down to the dirt and leaving no sticks, roots, or rotten wood to serve as a bridge by which the fire can cross this strip. Remember that even if such things appear damp, they dry as the fire eats along them, and may smoulder for days.

Never leave a fire until it is out. If water is not available, bury it with dirt.

Put out any fire you find, if you can; using water or earth and trenching around it. If you cannot, notify a fire warden, some other public officer, the land owner, or some one who will see that the word is properly carried. Make a point of knowing yourself the name and headquarters of the fire warden for the district you are in.

Do not burn a slashing in the dry season without a permit from a fire warden. Remember also that a permit does not relieve you of responsibility for damage if the fire escapes, nor from criminal liability

if you omit precautions to control it. It is unlawful to burn a slashing during the closed seasons unless all dead trees or snags over 25 feet high have been felled. Do not burn in strong wind, and always fire against the wind.

The best tools for fighting fire are the shovel, mattock, ax and wet sacks. Canvas or metal buckets for carrying water to the workers are essential for prolonged work.

Remember that in dangerous seasons houses and schools in forest regions are menaced by fires coming from a distance. However careful you may be yourself, you are not safe from these if your buildings are surrounded by inflammable debris. Dead trees, from which sparks may carry, are also dangerous.

CHAPTER XVIII

FACTS REGARDING OREGON'S FORESTS

Oregon contains one-fifth of the standing timber of the United States, or 545,000,000,000 feet. She ranks first among the States in this respect.

This timber is worth on the stump not less than \$680,000,000, and if manufactured will bring in over \$6,500,000,000 of outside money. It will either be manufactured or destroyed by fire.

Oregon's timbered area is approximately 25,000,000 acres. Of this amount one-half is patrolled by the Federal Government, the rest must be looked after by the State and the private owner.

Over \$4,700,000 worth of wood is used annually in Oregon wood-working industries. Of this, 31% is used for paper pulp, 27% for boxes 14% for sash and doors, and the remainder in the making of cooperage, boats, furniture, baskets, handles, caskets, columns, matches, etc.

Hemlock and spruce make up 81% of the woods used in the production of paper pulp. Sixty-nine per cent of our doors are made of spruce and fir. About half of the boxes made in Oregon are of spruce.

Douglas fir furnishes 83% of the material used in interior work, and is practically the only wood used in the cooperage industry and boat building. Nearly three-fourths of the handles made in Oregon are of Oregon oak.

Spruce, Douglas fir and hemlock contribute three-fourths of the material used by the woodworking industries of Oregon. Approximately 226,000,000 board feet of these species are used annually.

Over 80% of the annual sawmill cut of the State consists of Douglas fir.